

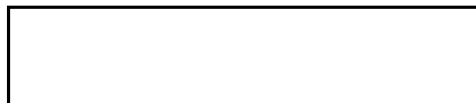
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CONTACT DUPLICATING AND RESEAU PRINTER
AND
HIGH RESOLUTION STEP AND REPEAT PRINTER

THIRTEENTH MONTHLY LETTER REPORT

August 10, 1965

Period: July 1, 1965 to August 1, 1965



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NGA Review
Complete

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1.0 CONTACT DUPLICATING AND RESEAU PRINTER

1.1 Purpose

The over-all objective of the current contract is the design, fabrication, test, and delivery in fifteen months of a Photographic, Step and Repeat, Contact Duplicating and Reseau Printer. Prime design goals are high-speed automatic operation, variable format capability, and high resolution with minimum film distortion or damage. The delivered equipment will be suitable for operational use. The printer will accommodate films of 70 mm to 9-1/2" width with frame lengths up to 30 inches and will provide operation in the reseau mode and selective mode as options.

1.2 Activity of this Report Period

A meeting was held at [] facility, and marked- STAT
up drawings of the pre-view and punch station based on [] STAT
supplied design layouts and the [] industrial design STAT
concepts were submitted by [] who is now awaiting STAT
authorization to proceed with the final design. The reseau grids
have been scribed by the [] and these are now STAT
awaiting the binding frames. Drawings of the latter have been
modified by [] to accommodate small solenoids for
pin actuation. Emphasis will be placed on producing a positive
indication of pin retraction and upon interlocking the pin actu-
ation with the film transport to prevent film damage.

A frame edge detector breadboard was completed by STAT

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and was delivered to the technical monitors in Washington so that a variety of film samples might be tested. A number of atypical film characteristics were discussed in connection with printer operation and frame detection. It was generally agreed by the technical monitors that when the density difference between the frame and the border is minimal, accurate and reliable frame-edge detection is not possible. The device has been designed to reliably stop on negative and positive frames in which there is at least a 0.2 density difference between the frame and the frame space.

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Advance copies of the Test Plan were submitted to the technical monitors for review and comments. A meeting was held at the facility on July 26 ^{→ Lima + Bul M, not RPD.} to review the Test Plan prior to final submission to the Contracting Officer.

Design and fabrication of the final printer is proceeding. The three-knob decade counter for metering duplicate film has been replaced by a selsyn motor design whereby one motor on the control panel tracks a second motor in the drive module for the film, and controls metering of the duplicate film. The metering motor will actuate "slow-speed" and "stop" switches of the magnetic reed type, so that infinite adjustment of frame length between 5" and 30" will be available, and only a single knob will be used for control setting instead of the previous three knobs. A mock-up is being fabricated for development and demonstration.

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[] has now designed ducting and air flow through the printer so that clean cooling air coming into the machine through the top filters is directed over the platen from front to rear, across the lamp bank and drive modules, and exhausted through the base of the unit. It was pointed out by [] that STAT an air-flow or negative pressure should exist in the under-floor ducting so that the air is not exhausting against a positive pressure, or head.

The installation specification form will be updated this month with current information, and will be forwarded to []

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[] for submission to the technical monitors later in the month.

1.3 Plans for Next Period

Fabrication and assembly of the final printer will be continued. The binding frame drawings will be released for fabrication. Detailed design and fabrication of the pre-view and punch station will commence.

1.4 Problems

Data to be furnished by the technical monitor concerning both negative and positive frame separation density variations are required promptly, so that the transport design can be completed without delay. A review of program status has been completed, and it presently appears that, because of delays incurred for the Design Plan review and approval, the printer delivery will be approximately one month late.

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1.5 Documentation

There was no new documentation this month.

1.6 Questions Outstanding

There are no outstanding questions this month.

2.0 HIGH RESOLUTION STEP AND REPEAT PRINTER

2.1 Purpose

The purpose of this effort is to design, fabricate, test and deliver in twenty months a high precision, step and repeat, photographic contact printer. This printer will be capable of producing photographic contact prints of the highest possible quality, resolution, and acutance from roll films of width varying from 70 mm to 9-1/2" and in preselected frame lengths from 5 inches up to a maximum of 30 inches.

2.2 Activity of This Report Period

2.2.1 Exposure Control and Light Source

Two new circuits were designed and breadboarded in an effort to eliminate unstable lamp operation at low current levels. A new design incorporating a fixed frequency oscillator and power amplifier was found to be stable over a wide range of currents.

The red fluorescent lamp was found to be producing much less radiation than claimed by the manufacturer, and has been replaced by a much simpler tungsten Lumiline lamp. The latter is richer in red emission, produces uniform illumination, and is directly

operable without ballasts. The lamp has been assembled into the breadboard and tested with a variety of filters to assure that film fogging will not occur.

The log-amplifier has been breadboarded and is presently under test. A modulation circuit will next be fabricated so that complete system operation may be checked out on the breadboard printer.

2.2.2 Film Gate and Scan Drive

Photocells have been installed inside the rolling air bag and are undergoing sensitivity tests. Variations due to bag density and imperfections in the plastic material will be measured dynamically. Plans are underway to modify the scan drive to utilize a velocity servo motor in place of the AC synchronous motor now being used. This will permit manually varying the scan speed to widen the exposure range, while maintaining a constant velocity at any setting.

2.2.3 Vacuum Capstan

The capstan drive servo amplifier has been completed and is undergoing bench tests and tuning prior to installation in the breadboard.

2.2.4 Film Transport

Both storage loops are now completely operable, and response appears to be satisfactory and as predicted.

A new design for the photocell frame-edge detector utilizing fiber optic light pipes has been fabricated and is currently

undergoing optical tests. This configuration, if tests prove it to be satisfactory, will permit the probe to be fixed under the film and will eliminate the need for a moving probe. Bench tests indicate good signal-to-noise ratios can be obtained, but light spot diameter must be reduced to make the system practical. *Did not*

2.2.5 Other Activities

A meeting was held with the technical monitor in Washington, and the new printer industrial design concept was presented showing the control panel and negative viewer location at the narrow panel end of the machine. The advantages of the new configuration were described, and it was subsequently approved by the technical monitor and operational user. [] was asked to submit a description of the change to the contracting officer, and formal approval to proceed would be sent. *STAT*

The installation engineering form was up-dated with the latest design information and was submitted to the technical monitor. Based on a subsequent phone call, [] agreed that castors would be furnished so that the printer could be moved from one area to another. The machine will be lifted off the castors by levelling jacks when the printer is in use. *STAT*

The technical monitor informed [] that the negative film is sometimes wound emulsion-in and sometimes emulsion-out, and the transport should, therefore, be capable of handling either situation. The effects of this information are under study, and it appears that, at least, a motor direction change will be *STAT*

STAT required. The technical monitor indicated that some sketches would be sent to to indicate that the film path and loading would remain unchanged. *sent 22/1/5*

Engineering design of the final prototype printer has been initiated and layout drawings have been started of the over-all machine. Space planning is proceeding, and electronic packaging techniques are under study.

2.3 Plans for Next Report Period

Testing of the full scale breadboard will be continued. Design and procurement of components will be stepped up for the final prototype. Government specification revisions have been tabulated and, upon completion of internal pricing and review, will be submitted to the contracting officer early next month. *Rec'd 2/2/5*

2.4 Problems

Lamp "banding" at low light levels still occurs intermittently, and varies from lamp-to-lamp. While this has been considerably improved with the new lamp drive circuit, the significance is not known, and will be tested dynamically on the printer breadboard.

2.5 Documentation

There was no new documentation this month.

2.6 Questions Outstanding

Range of voltage regulation of the government facility will be provided by the technical monitor. *no CH*

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